Claims 1-46 are currently pending. Claims 1-9 and 11-46 have been rejected. Claim 10 has been objected to. Claims 39 and 43 have been amended.

Claim 39 has been amended to recite that a transmitter transmits force when a first stage accelerates in one direction along an axis, but substantially does not transmit force when the first stage accelerates in another direction along the axis. Support for these amendments may be found in the Specification, as for example from page 18 at line 4 to page 19 at line 9. Amendments made to claim 43 are similar to those made to claim 39.

Objections to the Claims

Claim 10 has been objected to as being dependent upon a rejected base claim. The Examiner has indicated that claim 10 would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims. Since the Applicants believe that independent claim 1, from which claim 10 depends, is allowable over the art of record (as will be discussed below), the Applicants have chosen not to rewrite claim 10 in independent form at this time.

Rejections under 35 U.S.C. § 103

Claims 1-9 and 11-46 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Doran et al. (U.S. Patent No. 5,585,629) in view of Toshiya Asano (JP 2000223410).

Independent claim 14 recites a scanning apparatus which includes a coarse stage and a fine stage which are effectively coupled using a first coupler. The first coupler has a relatively high transmissibility when the coarse stage scans in a first direction along a first axis, and a relatively low transmissibility when the coarse stage scans in a second direction along the first axis. Hence, the transmissibility of the first coupler is sometimes high and sometimes low during scanning. The Examiner has stated that Doran et al. does not disclose a first coupler and a second coupler, but has

argued that Asano teaches the use of a coupler. It is respectfully submitted that the coupler of Asano is not a coupler for which the transmissibility changes depending upon a scanning direction. Asano specifically teaches that during acceleration/deceleration, it is preferable that the rigidity of a spring element (coupler) be high (Asano, paragraph 0035). Asano teaches against the rigidity of the spring element ever being low during acceleration/deceleration (scanning). As such, it is respectfully submitted that Doran et al., in combination with Asano, does not teach of or even reasonably suggest that a coupler has a relatively high transmissibility (*e.g.*, rigidity) when a coarse stage scans in a first direction and a relatively low transmissibility when the coarse stage scans in a second direction. Instead, Asano appears to teach that the rigidity of a spring element always has the same transmissibility irregardless of a direction in which a stage is scanned. Therefore, claim 14 is believed to be allowable over the art of record for at least this reason.

Claims 15-24 each depend either directly or indirectly from independent claim 14 and are, as a result, each believed to be allowable over the art of record for at least the reason set forth above with respect to independent claim 14. Each of these dependent claims recites additional limitations which, when considered in view of the limitations of claim 14, are believed to further distinguish the claimed invention over the art of record. By way of example, claim 15 requires a second coupler which couples the coarse stage and the fine stage. It is respectfully submitted that contrary to the Examiner's assertions, neither Doran et al. nor Asano teach of or even remotely suggest the use of a second coupler. Further, the second coupler is arranged to enable a relatively low transmissibility between the course stage and the fine stage when the coarse stage scans. As discussed above, Asano teaches of a coupler having a high transmissibility (*e.g.*, rigidity) during acceleration/deceleration (scanning), and does not reasonably suggest that any coupler has a low transmissibility during scanning. Accordingly, claim 15 is also believed to be allowable over the art of record for at least these additional reasons as well.

Independent claim 25 recites a scanning apparatus which includes a coarse stage and a fine stage which are effectively coupled using a first cord. The first cord has a relatively high transmissibility and is substantially stiff when the coarse stage accelerates in a first direction along a first axis. When the coarse stage accelerates in a second direction along the first axis, the first cord is substantially slack and has a relatively low transmissibility. Hence, the stiffness of the first cord

varies, along with the transmissibility, during scanning. It is respectfully submitted that the coupler of Asano does not teach of a coupler for which the stiffness or the transmissibility changes depending upon a direction or acceleration. As discussed above with respect to claim 14, Asano teaches that during acceleration/deceleration, the rigidity of a spring element is high (Asano, paragraph 0035). Asano teaches against the rigidity, or stiffness, of the spring element ever being low during acceleration/deceleration. In addition, contrary to the Examiner's assertions, the Applicants submit that Asano does not teach of or suggest the use of a cord between two stages. Asano teaches of using a spring element or a passive element between stages (Asano, paragraph 0030). There is no suggestion, however, that a passive element is a cord. Hence, claim 25 and its dependents are each believed to be allowable over the art of record for at least these reasons.

Independent claim 1 recites a scanning apparatus which includes a first stage and a second stage that are in contact with both a first coupler and a second coupler which are aligned along the same axis. While Asano does appear to teach of the use of a coupler between two stages (Asano, paragraph 0030), Asano teaches of using only one coupler. The use of two couplers allows scanning, *e.g.*, acceleration of a first stage, in two directions along an axis to benefit from the use of the couplers (Specification, on from page 14 at line 27 to page 15 at line 3). By way of example, scanning in a first direction may allow the second stage to scan through the first coupler, and scanning in a second direction may allow the second stage to scan through the second coupler. The use of only one spring element (coupler), on the other hand, as shown in Fig. 1 of Asano, allows for the acceleration or deceleration of an acceleration/deceleration stage in only one direction along an axis to benefit from the use of the spring element. It is respectfully submitted that neither Doran et al. nor Asano, alone or in combination, teaches of or even reasonably suggests the use of more than one coupler. Therefore, claim 1 is believed to be allowable over the art of record for at least this reason.

Claims 2-13 either depend directly or indirectly from independent claim 1 and are, hence, each believed to be allowable over the art of record for the reasons set forth above. In addition, each of claims 2-13 recited additional limitations which, when considered in light of independent claim 1, are believed to further distinguish the claimed invention over the art of record. By way of example, the Examiner has already indicated that the limitations of claim 10, taken in view of claim 1 from

which it depends, are allowable over the art of record. In addition, dependent claim 5 requires that at the same time that a first coupler provides a substantially rigid coupling, a second coupler provides enables substantially minimal vibrations to be transmitted between stages. It is respectfully submitted that there is no suggestion in the art of record of using a coupler which would be in a substantially rigid state at the same time that a second coupler enables the transmission of minimal vibrations, since none of the art of record teaches of or reasonably suggests using more than one coupler. Therefore, dependent claim 5 is also believed to be allowable over the art of record for this additional reason.

Like independent claim 1, independent claim 33 also requires the use of a first coupler and a second coupler and is, therefore, believed to be allowable over a combination of Doran et al. and Asano because Asano does not suggest the use of more than one coupler. The first coupler couples a first surface to a stage mechanism, and the second coupler couples a second surface to the stage mechanism. The first coupler is in a first state when the first stage mechanism moves along a first axis in a first direction, while the second coupler is in a second state. There is no teaching or suggestion in the art of record of using a first coupler and a second coupler which are in a first state and a second state, respectively, when a stage mechanism moves in a first direction. Therefore, claim 33 and its dependents are each believed to be allowable over the art of record for at least these reasons.

Independent claim 39, as amended, requires that a transmitter which is disposed between a first stage and a second stage transmits force between the first stage and the second stage when a driving device accelerates the first stage in a first direction. The transmitter does not transmit a force between the first stage and the second stage when the driving device accelerates the first stage in a second direction. Since Asano teaches of a spring element (transmitter) driving a positioning stage whenever an acceleration/deceleration stage accelerates (Asano, paragraphs 0034 and 0035), it is respectfully submitted that no combination of the art of record teaches of a transmitter which is arranged to transmit force when acceleration is occurring in one direction along an axis, and not arranged to transmit force when acceleration is occurring in another direction along the axis, as required by claim 39. Accordingly, claim 39 and its dependents are believed to be allowable over Doran et al. in view of Asano for at least this reason.

Independent claim 43, as amended, requires that when a first stage accelerates in a first direction along an axis, a transmitter causes a second stage to accelerate by transmitting a force between the first stage and the second stage. However, when the first stage accelerates in a second direction along the axis, the transmitter does not transmit force between the first stage and the second stage. As discussed above, none of the art of record teaches of a transmitter (*e.g.*, spring element) which transmits force when acceleration occurs in one direction along an axis, and does not transmit force when acceleration occurs in another direction along the axis. Asano specifically teaches that during acceleration, a drive force is conveyed via a spring element (Asano, paragraph 0034), and does not teach of a drive force not being conveyed by the spring element during acceleration. Therefore, claim 43 and its dependents are believed to be allowable over the art of record for at least this reason.

In general, the Applicants submit that contrary to the Examiner's statement in the Office Action dated March 14, 2002, it would not have been obvious to a person of ordinary skill in the art at the time the invention was made to add a coupler as taught by Asano to the scanning apparatus taught by Doran et al. in order to connect stages. Doran et al. teaches of minimizing heat sources within an electron beam column to enable the precise measurements to be made (Doran et al., column 8, at lines 6-10). Doran et al. discloses that heat generating sources include various metal components which may intercept electrons (Doran et al., column 8, lines 11-13). Asano discloses the use of a spring element which, as will be appreciated by those skilled art, which is likely to be fabricated from metal. As such, it is respectfully submitted that combining the teachings of Doran et al. and Asano would not result in the minimization of heat sources. Since Doran et al. does not disclose that a linear motor generates a problematic amount of heat when an acceleration level is high, adding a spring element which may actually serve as a heat generating source may be detrimental.

In view of the above, the Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below. If any fees are due in connection

with the filing of this amendment, the Commissioner is authorized to charge such fees to Deposit Account 50-1652 (Order No. NRCAP003).

Respectfully submitted,
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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

39. (Amended) A positioning apparatus comprising:

a first stage, the first stage being arranged to be movable along at least one axis;

a first driving device coupled to the first stage, the first driving device moving the first stage along the at least one axis;

a second stage, the second stage being arranged to be movable with the first stage along the at least one axis;

a second driving device coupled to the second stage, the second driving device moving the second stage relative to the first stage; and

a transmitter disposed between the first stage and the second stage, the transmitter being arranged to transmit [transmitting] force between the first stage and the second stage, wherein when the first driving device accelerates the first stage along the at least one axis in a first direction, the transmitter transmits the force such that the first stage provides a pulling force on the second stage from a direction of movement of the second stage, and wherein when the first driving device accelerates the first stage along the at least one axis in a second direction, the transmitter substantially does not transmit the force between the first stage and the second stage, whereby when at least one of a first speed of the first stage and a second speed of the second stage is substantially constant, the second driving device moves the second stage to position the second stage at a desired position.

43. (Amended) A method for positioning an object, the method comprising:

accelerating a first stage along at least one axis;

accelerating a second stage with the first stage along the at least one axis in a first direction by transmitting force between the first stage and the second stage by utilizing a transmitter when the first stage accelerates in the first direction, wherein when the first stage accelerates along the at least one axis in a second direction, the transmitter substantially does not transmit the force between the first stage and the second stage; and

positioning the second stage by utilizing a driving device that moves the second stage relative to the first stage when at least one of a first speed of the first stage and a second speed of the

second stage is constant, wherein the transmitter transmits the force such that the first stage acts as a pulling force on the second stage from a direction of movement of the second stage.